CHAPTER 1
Development of Slovene specialized terminology in the 19th century through translations of mathematics and biology textbooks

Tanja Žigon and Karin Almasy

Abstract

The article focuses on the first approved textbooks in the fields of botany and mathematics. In both of these fields, translators did pioneer work and created Slovene terminology, which later either gradually became the norm or, when the terms were merely temporary, was replaced. These textbooks are considered as some of the first specialized books in Slovene and have gone through the hands of entire generations of secondary school students, who mostly became university students in Vienna, Graz or Prague and later formed the Slovene intellectual elite. Through the translations of these textbooks and with their

terminological solutions, the translators created the guidelines for all later original and translated textbooks. However, the road to the gradual birth of Slovene specialized language was quite long. In this sense, this article focuses on teachers, translators, authors and other agents that made important contributions to the formation of specialized language, but who are nevertheless often overlooked. In particular the translators of textbooks from German to Slovene are shown here as innovators on the stage of Slovene cultural history, who coined new words, several among which have been preserved until the present day and have found their way into standard written Slovene and its specialized language.

Keywords: textbook translation, 19th century, specialized terminology, German influence, interference

Izvleček

Prispevek se osredotoča na prve aprobirane učbenike s področja matematike in biologije, saj so prevajalci na obeh omenjenih področjih orali ledino in ustvarjali in oblikovali terminologijo v slovenščini, ki se je zatem začela bodisi počasi uveljavljati bodisi so bile rešitve zgolj zasilne in so jih pozneje nadomestile nove. Prevajalci učbenikov, ki veljajo za ene prvih strokovnih knjig in so jih imele v rokah cele generacije gimnazijcev, večinoma kasnejših študentov na Dunaju, v Gradcu ali Pragi, iz katerih je izšla slovenska intelektualna elita, so s svojimi prevodi in terminološkimi rešitvami oblikovali smernice za vse poznejše avtorske in prevedene učbenike. A dejstvo je, da je bilo treba prehoditi dolgo pot, preden se je postopoma začel rojevati slovenski strokovni jezik. V tem smislu pričujoča razprava namenja pozornost šolnikom, prevajalcem, avtorjem in drugim akterjem, ki so pomembno prispevali k oblikovanju strokovnega jezika, a (pre)pogosto ostanejo prezrti. Predvsem prevajalci učbenikov iz nemščine v slovenščino tako stopajo na prizorišče slovenske kulturne zgodovine kot inovatorji, ki so kovali nove izraze, med katerimi so se številni ohranili vse do danes in, gledano z današnje perspektive, našli pot v knjižno slovenščino in v njen strokovni jezik.

Ključne besede: prevajanje učbenikov, 19. stoletje, strokovna terminologija, vpliv nemščine, interference

1 INTRODUCTORY REFLECTIONS

In the second half of the 19th century, the national Slovene identity was slowly beginning to be built, while the Slovene language was developing into a unified, standardized and codified written language. All aspects of the language, including academic writing in all the disciplines were evolving, above all in the context of terminology development. After the March Revolution in 1848, which brought changes also in the field of education, the state claimed control of the production of modern textbooks. The functions of these new textbooks were not anymore only religious, but their aim was also to fulfil the basic duty of the school system, that is the transmission of knowledge. Consequently, they also acquainted Slovene pupils and secondary school students with scientific and specialized content in their mother tongue. These processes took place one alongside the other, influencing each other. The books became a strong foundation on which the common Slovene language and national Slovene identity were being built (Almasy 2018, 63–134; Govekar Okoliš 2004, 226–241), because they accompanied generations of students, who learned and grew up with them.

It appears that it was in fact the unification and centralized management of the field of education that contributed most significantly to the development of a unified standard language and consequently to the formation of a national Slovene group identity. Centralized education enabled and promoted the development of a common "national" language and of a codified Slovene literature. Consequently, the idea that they are not (just) Kranjci, Štajerci, Korošci and Primorci, but also Slovenes, slowly began to grow stronger among students. And so, the awareness of a common national identity that went beyond the regional borders (Schmidt 1966, 330) started to take form. Compulsory education, which was introduced as early as in the 1770s, became a reality only in the second half of the 19th century, gradually gaining importance in the consciousness of the Slovenes. People started to realize that education represents symbolic capital, an entrance ticket to a better future and a step up on the social scale.

It is a fact that the *lingua franca* of the field of higher education in Cisleithania, the Austrian half of the monarchy, was German, while the Slavic languages strived to compete with it. For Slovene, the credit in this field goes to numerous intellectuals, politicians, writers and teachers, who worked in the multilingual and multicultural society of the Habsburg monarchy and often happened to take on the role of translators. Based on analysed sources and biographies (Almasy 2018, 139–186), it is clear that the professional categories that are unambiguous and neatly separated today were not as clearly distinguished then, and that the intellectuals of that time were active in many areas, in a true universal spirit. Rather typically, therefore, a Slovene teacher, writer, intellectual, cultural figure,

clerk, priest or politician of the 19th century would *also* translate, among other things. In this context, the typical reception of translators and translation work in Slovenia becomes apparent as well. Rather than to translation, a much greater significance and role is attributed to authorial work. Attention is frequently drawn to the contributions of writers and poets to the Slovene culture and language, but much less attention is given to translation activity. This is one of the reasons why in this article we explore the role of translators in the formation of specialized terminology and language by focusing on the translations of textbooks in the second half of the 19th century. These translations in fact represented the birth of Slovene terminology in various specialized fields.

In order to allow a better understanding of the subject and to give a clear overall picture, in the article we initially present the conditions in the education field in the second half of the 19th century and explore the influence of the German language on Slovene. After that, we present an overview of the formation of Slovene specialized terminology in the above-mentioned period, focusing on the terminology of the fields of mathematics (algebra and geometry) and biology. On the basis of individual examples, we also present the fundamental approaches and strategies used by textbook translators for the creation of specialized terminology. Thus, in this article, we try to verify the hypothesis that those translators clearly did decisive, important and, in effect, pioneering work by first searching for Slovenian specialized terms and shaping specialized terminology.

2 EDUCATIONAL, LANGUAGE AND CULTURAL POLICY IN THE SECOND HALF OF THE 19TH CENTURY

The March Revolution in 1848 brought about fundamental educational reforms, which were followed by the liberal reforms in the 1860s. From then on, schools were no longer a "private" domain of the Church, as the field of education passed into secular hands, and after these textbooks did not only aim to raise morally and religiously "impeccable" subordinates. Their basic purpose, instead, was now to educate responsible citizens and widen their knowledge (Engelbrecht 1986, 5).

In the second half of the 19th century, different types of schools began to take shape. Apart from people's schools (*Volksschule*), civic schools (*Bürgerschule*) were also established as some kind of extension of people's schools, which were attended by pupils who did not continue their education at the secondary level. After 1848, the *gymnasium* programme lasted eight years and was completed with a final examination called a *matura*. A successfully completed final examination opened the door to university. Since after 1848 the *gymnasium* pursued general

educational goals, the subjects centred on the languages and history (catechesis, Latin, Greek, mother tongue, geography and history) were integrated also with subjects dedicated to mathematics and sciences (mathematics, physics, chemistry and biology). Apart from *gymnasium*, the *Realschule* secondary schools were also established, which were oriented towards crafts and practical technical knowledge. Their main subjects were mathematics and sciences, as well as living languages, and they adapted their contents to the needs of the crafts and industry. Along with them, there were also the vocational schools, which laid the grounds for the dual system in the field of vocational education in the 19th century. These schools focused on crafts, agriculture, forestry or handicrafts, but there were also programmes for midwives, winemakers, fruit growers, etc.

In the second half of the 19th century schooling gradually became a natural part of childhood, people started to become aware of the importance of education, and schooling became differentiated. The centralization of the education policy, which was in the hands of the Ministry of Religion and Education, brought about the unification and standardization of education. In this regard, an important role was also played by the professionalization of the teaching profession. After 1848, or rather finally after the passing of the *Reichsvolksschulgesetz* in 1869, the textbook policy was under the supervision of the state in the Habsburg monarchy, which held the monopoly over the official acceptance of textbooks, i.e. the approbation, and thus the last word regarding the content of such books. The state also had its own publishing house that issued textbooks – the *k. k. Schulbücherverlag* in Vienna.

The Slovene language was introduced into schools with several small steps. An important distinction that needs to be made is that between Slovene as the language of instruction and Slovene as a school subject (especially in secondary schools). In people's schools, Slovene was used in the Slovene territory even before 1848, but it was merely the language of instruction for teaching Catholic morals and a hierarchical world view that divided people according to their social class. After 1848, learning the language became a purpose and goal in itself. As Schmidt points out, this is one of the greatest achievements of the revolution of 1848 (Schmidt 1966, 118–119).

On the secondary level, from the 1850s to the 1870s, Slovene was not considered developed enough to be used as a teaching language (Žerjav 1970, 413–472). The same arguments were stated repeatedly, and they usually went along the lines that Slovene did not have its own literature yet, that there were no adequate textbooks nor specialized literature in Slovene, and that specialized terminology in the language was underdeveloped. Another complaint was that there was a lack of qualified teachers – therefore Slovene could not become the medium of instruction in middle and secondary schools (Schmidt 1966, 88–89). It was indeed

a vicious circle, or the "*vekovečni circulus vitiosus*", as Ivan Tušek (1862, 172) labelled it: No-one spoke Slovene well because schools were not Slovene, and schools could not be Slovene because there were no Slovene textbooks (ibid.). That is why, after 1848, it was imperative (especially for higher-level schools) to prepare appropriate Slovene textbooks, in order to introduce suitable terminology for all subjects and to train suitable teachers.

Therefore, it took the Slovene language several small steps to enter the *gymnasium* and the first step was the introduction of Slovene as a subject. At first, in 1850, Slovene was accepted into the *gymnasium* programmes as a free elective subject. Slowly the language then advanced from an elective to a compulsory subject for all Slovenes, first in the lower years and later in the higher years of the *gymnasium*. For Germans, Slovene remained a free elective subject (Almasy 2014: 148–153; Žigon, Almasy and Lovšin 2017, 41–42). Slovene was present for the first time on the list of subjects for the final examination as early as in 1850, for the students that had chosen it as a compulsory subject in 8th grade. But the fact that a student could advance from a lower to a higher grade in spite of a negative mark for this subject amply testifies to the position of Slovene in the curriculum. The unequal status compared to other subjects was abolished in 1860, when Slovene became a compulsory subject and part of the final examination for Slovene *gymnasium* students. German students often chose it, but for them it was still a free elective subject, for which a positive mark was not required: German was still regarded as having a more important, superior position (Schmidt 1966, 21).

Regardless of that, the introduction of Slovene as a subject in the *gymnasium* curricula paved the way to Slovene also being used as a teaching language in other fields. Slovene was used for catechesis (which no one ever objected to, anyway), and later also for "easier" subjects such as geography and history. At the end of the 1860s, Slovene gradually made its way to a smaller or greater degree into the *gymnasiums* of the Slovene territory. The first *gymnasium* with Slovene as a teaching language for all the subjects was the *Realschule* in Kranj, in 1870; obviously, German remained a compulsory subject (Schmidt 1966, 318–319; Engelbrecht 1986, 314–315).

German was present throughout the 19th century as the language with more power and status, and any analysis of the development of Slovene in that period cannot be carried out without also considering the influence of German on it. The intellectuals from the Slovene ethnic territory – and among them the first few female students[1] – who studied in Vienna, Graz and Prague in the second half

1 For women, the doors of the university in Vienna were opened in 1897 (Cindrič 2009, 242–257; Cindrič 2013, 121; Kramberger, Samide and Žigon 2018, 5–13). The first European university that accepted female students was Zürich University in 1863, followed in the same year by the French universities, then Swedish (1870), English (1873), Finnish, Danish and Dutch (1875), Italian and Belgian (1876), Norwegian (1882), Greek (1890), Scottish (1892) and Turkish (1894). Even just before the end of the 19th century, more than three decades later, one of the last European countries that allowed women to study was Austria, and it was followed by Prussia in 1906, while Russian female students had to study abroad, mostly in Switzerland, until 1913 (Cindrič 2013, 121).

of the 19th century and the beginning of the 20th century, were all very proficient in German. In the 19th century, we therefore witness a diglossic situation among the Slovene elite. In their native microcosmos, intellectuals often spoke German much better than Slovene, which is linked to the fact that German was the language of higher education: they read German literature (scientific, technical and literary texts); they also had access to well-stocked private libraries (Dular 2009, 13–30). In the middle of the 19th century, in his work *Napake slovenskega pisanja* (*Mistakes in Slovene Writing*), published in several issues of Bleiweis's *Kmetijske in rokodelske novice* (*Agricultural and Handicraft News*), the writer and literary critic Fran Levstik stated:

> Skoraj vsi, ki pišemo, *stavimo* slovenske besede, *mislimo* pa le nemški. Po taki poti ne upajmo kmalu izvrstne slovenske proze. Čudo res ni, da je tako, ker se ločimo iz domačega kraja, ko smo še otroci; potem pa v mestih živimo, govorimo večidel nemški, beremo večidel nemške knjige poleg pisanja drugih narodov[2] (Levstik 1956, 38).

In other words, in this period, the Slovene literary language was only starting to get its shape. This holds even more true for individual specialized languages. In the middle of the 19th century, Slovene could not yet draw terminology from its own original production for different types of content and specialized areas. The translations of monographic textbooks, i.e. scientific and mathematical textbooks, were extremely difficult for the translators because they had to overcome a number of difficult translation and linguistic problems, often having to find new, appropriate terms in Slovene (cf. Almasy 2016, 491; Žigon, Almasy and Lovšin 2017). The translators therefore had to do pioneering work, (re)create specialized language and place Slovene side by side with German, demonstrating with their work that the former was equal to the latter in all respects. So in the 19th century, language barriers were not crossed only by the authors of original Slovene literary works, but also (and especially) by translators, who used their own knowledge and what little resources and aids they had available (dictionaries, grammar books or encyclopaedias) to tackle texts in foreign languages and transfer them into their mother tongue.

The rest of this paper is devoted to the analysis of specialized monographic textbooks that were approbated, since we can undoubtedly state that they were in general use for several years. The discussed examples are taken from textbooks for mathematics and biology, all of them translations from already existing German textbooks into Slovene. The analysis aims to explore how translation played a crucial role in the development of Slovene for specific purposes.

2 English translation: "Almost all of us who write, use Slovene words, but still think in German. This way we cannot hope to have excellent Slovene prose any time soon. It is not strange at all that it is so, as we leave our hometowns when we are children; then we live in cities, speak mainly German, read mainly German books, along with the writings of other nations."

According to the principles of sociological and historical approaches in translation studies, when doing translation analysis it is not enough to merely compare and analyse source texts and translations, but it is always necessary to take into account the political, social and historical circumstances in which the originals and translations are created (cf. Pym 1998 and 2009; Wolf 2003). Therefore, in the following chapters, primary and secondary literature, but especially previously unpublished archive sources, such as files of the approbation process of schoolbooks and included expert's reports (see the listed Primary Sources at the end of this paper) have been consulted. By doing so, we aim at presenting the cultural-historical, as well as linguistic and translation-related circumstances in the field of the translation of specialized books in the Slovene territory during the second half of the 19th century.

3 FORMATION OF SLOVENE TERMINOLOGY

A serious problem that needed to be addressed by the translators into Slovene in the second half of the 19th century was the absence of appropriate terminology and relevant dictionary sources. Martina Orožen (2003, 260) argues that "the nationally conscious experts of Slovene origins who were proficient in the specialized German vocabulary of different fields were painfully aware of this absence", so that even the goal of the terminological efforts was emancipatory. They wanted to elevate "not only the terminology but also the Slovene specialized and scientific language as a typical genre of written language" to the level of other European cultural languages (ibid.). In their work, Slovene translators could rely only on a few grammatical sources, such as the *Kraynska grammatika,* a grammar of the Slovene language by Marko Pohlin (1735–1801), the methodologically excelling Slovene grammar *Windische Sprachlehre* (1777) and the *Deutsch-windisches Wörterbuch* dictionary (1789), edited by Ožbalt Gutsman (1727–1790), and the work of the literary historian, Slavist and ethnologist Matija Murko (1861–1952) the *Lehrbuch der Windischen Sprache* (1824) by Peter Dajnko; another source used was the Slovene-German dictionary *Ročni slovar slovenskega in nemškega jezika* (1850/1851) by Anton Janežič (1828–1869). In 1860, after over half a century of material collection, the comprehensive Wolf's German-Slovene dictionary was published by Matej Cigale (1819–1889), which was an important achievement for Slovene lexicography. Less than three decades later, this German-Slovene dictionary was also followed by its Slovene-German counterpart compiled by the linguist and lexicographer Maks Pleteršnik (1840–1923). Apart from that, translators used other foreign-language dictionaries as well (Žigon, Almasy and Lovšin 2017, 71–73).

The first turning point in the translation of specialized terminology appears to be found in the field of legal texts. The translation of legal texts in the Habsburg monarchy was made possible by the development of terminology in the official languages, Slovene included, considering that before then the small languages in the monarchy did not have the right language resources in this field (Jemec Tomazin 2010; Wolf 2005, 2012). The greatest lack in terminology was therefore perceived in the fields of technology and science, where Slovene did not have its own specialized terminology. Obviously, this was not only a problem for the Slovenes in the monarchy: other Slavic nations also did not fare much better (Legan Ravnikar 2010, 49–74). The first systematic terminological state-led endeavour to create legal terminology was made by the so-called terminology commission in 1850 in Vienna, the purpose of which was the translation of the *Reichsgesetzblatt*, texts of law, into the Slavic "dialects", as they were named then (Nuč 2017). The commission had five sections (Czech, Polish, Ruthenian, Illyrian-Serbian and Slovene). Slovenes were represented in the commission by the linguist and Slavist Franc Miklošič, the linguist Matej Cigale and the lawyer Matija Dolenc. The result of the work of the Slovene and Illyrian-Serbian section was the common Slovene-Serbian-Croatian manual *Juridisch-politische Terminologie. Deutsch-kroatische, serbische und slovenische Separat-Ausgabe*, which was published in 1853 and contains legal and administrative terms in four languages (Commission 1853; Hebenstreit and Wolf 2001, 171–173).

The picture was slightly different in the natural sciences, as some older, popular science works in Slovene that were themselves translations from German already existed. The translators of specialized textbooks from the field of natural sciences also used these first simple translations of specialized texts, for instance those authored by Matija Vertovec (1784–1851), who adapted/translated/rewrote for Slovene readers texts such as *Vinoreja* (*Winemaking*, 1844) or *Kmetijska kemija* (*Agricultural Chemistry*, 1847), and various popular science articles from the newspaper *Kmetijske in rokodelske novice*, which were published since 1843. The next very important step for the development of natural science terminology was made in *Knjiga prirode* (*The Book of Nature*), the Slovene translation of *Das Buch der Natur*, which was published in several volumes by the *Slovenska Matica*.[3] The complexity and difficulty of the text's contents is testified by the fact that the four volumes of the book were translated into Slovene by four translators/naturalists (for the analysis of the *Knjiga prirode* translations cf. Bezjak 2005; Ciomaga 2015; Prunč 2008, 117–120; Prunč 2012, 88–90; Škornik 2006). The prestige and complexity of the project and task is testified by the fact that specialists of individual fields

3 In 1869/1870, the first volume of *Schoedlerjeva knjiga prirode* (*Schoedler's Book of Nature*) was published with the title *Fizika, Astronomija in Kemija* (*Physics, Astronomy and Chemistry*). *Fizika* was translated by the pedagogue and naturalist Ivan Tušek (1835–1877), *Astronomija* by the jurist and astronomy articles writer Viljem Ogrinc (1845–1883) and *Kemija* by the natural scientist Fran Erjavec (1834–1887). In 1871, *Mineralogija* (Mineralogy) and *Geognozija* (Geognosy), translated by Janez Zajec (1842–1872), were published, and in 1875, *Zoologija* (Zoology), translated by Fran Erjavec, and *Botanika* (Botany), translated by Ivan Tušek.

were recruited as translators and they were offered the same fees as authors (Bezjak 2005, 20). When the Croatian *Matica Hrvatska* tried to undertake a similar project it failed, as they did not manage to find suitable translators (Čermelj 1964, 283). *Knjiga prirode* therefore clearly shows the desire for cultural and linguistic emancipation of Slovene intellectuals, as the *Slovenska Matica* wanted to publish a book that would encompass all the fields of natural science and thus prove that Slovene was able to fulfil the task of scientific communication. Thus, as Prunč (2007, 58, cf. also Prunč 2006) observes, it was an emancipatory act.

3.1 The pioneers of Slovene terminology: The case of geometry terminology

Terminological initiatives emerged already in the 1850s, even from the highest educational circles, which again shows the importance of the role played by agents in the field of education at the level of the state, not just the local level, in the process of creation of Slovene specialized terminology. A particularly representative and illustrative example is the attempt to introduce Slovene terminology in the field of geometry, which can be reconstructed on the basis of archival documents (AS 31, Namestništvo v Ljubljani, Folder 31/13,14: 31/13,14: Act from 6 June 1854, No. 6606).

At the beginning of June 1854, the Ministry of Religion and Education sent the provincial authorities in Ljubljana a copy of the German textbook for geometry used in the lower grades of *Realschule*. In the document, the Carniolan authorities were asked to consider whether it would be advisable for secondary school students to also know geometry terminology in their mother tongue, as this was already the case in Czech schools,[4] where geometry was taught in German, but the terminology also explained to Czech students in the local language. In case, the document reads, the provincial authorities agree, they should provide a translation of the terminology into Slovene.

In this case, the desire for improvement was not a bottom-up initiative, but just the reverse, a top-down approach. The initiative came from the Vienna Ministry, which invited the provincial government to consider the proposal and make a decision in this regard. The provincial authorities then contacted local experts and asked the provincial educational institutions, i.e. individual schools and teachers, to express their opinions. This practice clearly shows that the (Slovene) periphery was not always the one that demanded its linguistic rights. The modernizing

4 The flagship in the introduction of terminology in a provincial language in education was Czech, as the production of Czech textbooks in that period was much greater than, for instance, the Slovene production, therefore the Ministry liked to give the Czech language as an example.

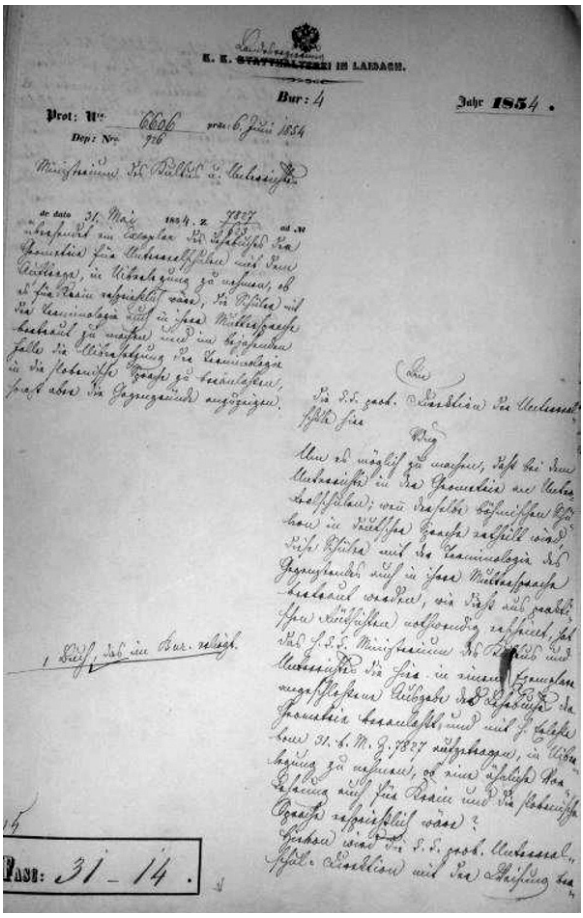


Image 1: Letter of the Vienna Ministry of Religion and Education to the Carniolian provincial authority in Ljubljana asking them to consider the preparation of a translation of geometry terminology into Slovene (AS 31, Namestništvo v Ljubljani, Folder 31/13,14: Act from 6 June 1854, No. 6606)

influences to the benefit of the (Slovene) periphery often came from the (frequently hated "German") centre, despite it being sometimes unjustly attributed a different role (Almasy 2018, 142–172).

At the end of June 1854, the teacher Mihael Peternel expressed his opinion, in the name of the Ljubljana lower *Realschule*, on the introduction of Slovene terminology in geometry lessons. In a several pages long letter, and on behalf of the Ljubljana *Realschule*, he convincingly presented the linguistic conditions in the *Realschule* and the importance of the translation of the terminology into Slovene (AS 31, Namestništvo v Ljubljani, Folder 31/13,14: Act from 28 June 1854,

No. 7544). Peternel stressed that despite German being the official language of instruction of the lower *Realschule* in Ljubljana, teachers always did their best to find the right expressions in Slovene as well. They tried to use Slovene expressions to explain geometric relations, otherwise the students would misunderstand or not understand at all.

Regarding the question of whether the translation of geometry terminology into Slovene was necessary or at least recommended, Peternel stated that all geometry teachers are of the same opinion. He continued that such a translation is not only recommended, but essential for the students and teachers.[5] He gave the following reasons:

a) A number of students, especially those coming to the 1st grade of the *Realschule* from the Hauptschulen of other Carniolian towns, have such limited knowledge of German that they barely understand everyday words, and even with these it is sometimes necessary to explain and "interpret" unknown German expressions.

b) Peternel believed that Slovene was not unified yet, and that the crafts vocabulary in particular had many different versions, causing and leading to downright comical situations where Slovenes do not even understand one another. He argued that the Slovene expressions are "quite commonly used among the simple craftsmen, while in the town, badly coined words that are neither German nor Slovene are being created under the influence of immigrant German craftsmen. It thus often happens that a craftsman from the countryside comes shopping into town and tells the merchant what he needs, but the merchant says that he does not have the goods, although the confused craftsman can see the item in front of him on the shelf. Then the merchant names the same item with a Slovenized German word or even with one of Romance origin and sells it to the desperate craftsman".[6] And the situation was no different at school, Peternel continued, as teachers try in vain to explain things to the students in a twisted urban version of Slovene. The teachers, who

5 We know from the archive sources that teachers often encountered problems with the comprehension of specialized texts. On 12 May 1867, teacher Valentin Konšek (1816–1899) asked the Vienna Ministry through the provincial government to approve Erjavec's *Živalstvo (Animals*) as auxiliary teaching material for use in schools (AS 33, Deželna vlada v Ljubljani, Folder 31/14, No. 5597). In the letter, Konšek notes that half of the students in the first grade of the Ljubljana *gymnasium*, where he taught natural science subjects in the 1860s (Pirjevec 2013), speak German rather poorly, and that the lack of knowledge of German, the language of instruction, represents an obstacle to understanding the learning material in individual subjects, and that the problems, of course, become worse year after year.

6 In the original it reads: "Die echt slowenischen Ausdrücke sind beim schlichten Gewerbemanne auf dem Lande ganz gang und gebe, in der Stadt sind sie aber durch den Einfluss eingewanderter deutscher Gewerbeleute aus der slowenischen Sprache der Städter durch ganz verhunzte weder deutsche noch slowenische Wörter großentheils verdrängt, daher geschieht es häufig, daß wenn der ländliche Gewerbemann seinen Bedarf in der Stadt einkaufen kommt, und die begehrten Sachen slowenisch benennt, zur Antwort bekommt: Das haben wir nicht, obwohl die verlangte Ware ringsherum im Laden zu sehen ist und nur vom Handelsmann mit einem slowenisierten deutschen oder gar romanischen Worte benannt wird."

actually do speak both the provincial languages, are no philologists, so sometimes they are unable to find the right Slovene words, which often happens especially with the terms for technical objects. Therefore, Peternel concluded, even if all the teachers spoke Slovene, this process would still take a lot of their valuable time. But all this would change if the textbooks contained, "expressions agreed upon once and for all" in the official languages.

c) Further on, Peternel's letter stated that the goal of the lower *Realschule* was to raise the level of knowledge in the fields of the crafts and arts in the province: the students that will one day become masters or supervisors will need to speak with their apprentices and workers in a language that they would understand, which would be rather hard without Slovene terminology.

d) In the next argument, Peternel moved away from education and observed the pressing issue from a wider perspective. He warned that sooner or later it will be necessary to start publishing popular-science books in Slovene, if we want to promote craftsmanship and enable its permanent development – and without proper terminology this will be difficult as well. This means, according to Peternel, that it is necessary to go among the people, collect words and record the spoken language, and then spread the vocabulary among the people, without unnecessary foreign-language additions. As examples of good practices, he quoted some works from different fields that had been published in the 1850s, such as Vertovec's *Vinoreja* (*Winemaking*), Robida's *Fizika* (*Physics*), Bleiweis's *Živinozdravstvo* (*Veterinary Medicine*) and others that could be understood by any Slovene. He notes, however, that even in these cases the terminology varies considerably from one book to another. Peternel saw the reason for this in the fact "that the cited authors did not find a unified Slovene terminology, therefore each of them had to collect the terms in their own surrounding area and compile a terminology of their own".[7] At the same time, he wondered how much more uniform the Slovenian expressions would have been if all the authors mentioned had also been consistently and uniformly taught the Slovene equivalents of the terms that they studied in German, Latin and Greek (AS 31, Namestništvo v Ljubljani, Folder 31/13,14: Act from 28 June 1854, No. 7544, Peternel's letter to the provincial government).

Peternel concluded his letter saying that teachers mostly agreed that it would be good and sensible to introduce Slovene terminology in other specialized

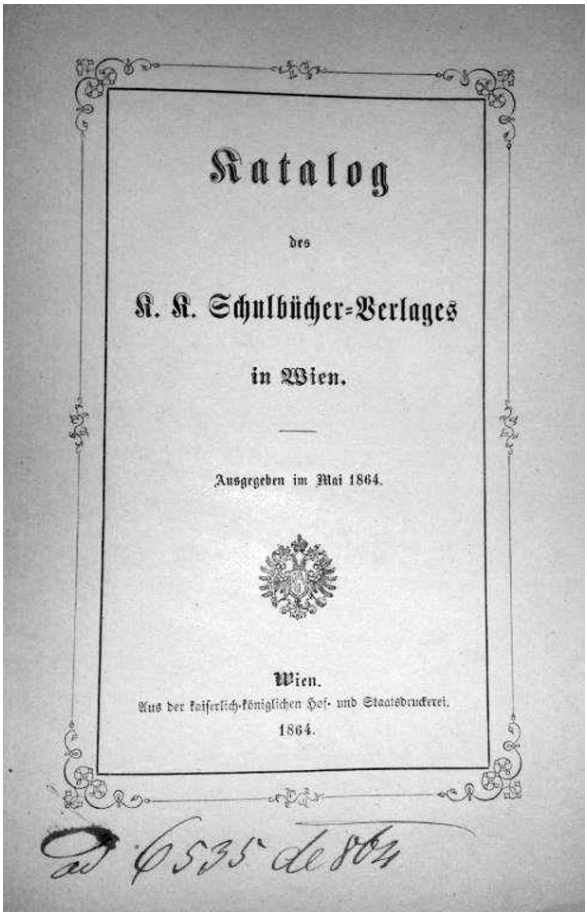
7 The original version says: "Weil diese Männer in der Schule nie eine slowenische Terminologie gelernt haben und sich daher jeder eine eigene in seiner nächsten Umgebung sammeln und nach seiner Art zusammenstellen musste."

subjects, such as zoology, botany, mineralogy, as well as mathematics or civil engineering. He himself, along with some other teachers, Peternel emphasized, are already introducing Slovene terminology in their subjects. Furthermore, he noted that "compiling a complete, real collection of Slovene technical and scientific terminology would nevertheless be associated with great effort and it would require a lot of time". In his opinion, the reason for this is the fact that the teachers would need to search for the right terms in the countryside, as in the towns they have been chased out by foreign expressions. Peternel's thesis is therefore that "pure, unadulterated" Slovene specialized terminology, or at least that of the crafts, has been preserved only in the countryside and it should be sought there, as if a hidden treasure. The linguists that live in the town, in his opinion, are rather more concerned with literature and are not interested in the research of technical and scientific language, because they are not experts in the technical and scientific fields. Peternel finished by stating that it would be easiest if the terminology for geometry was compiled by teachers, who are in constant contact with the students, teachers who know the local language and who also know the needs of their students. He also added that he would be willing and happy to take on this demanding job (AS 31, Namestništvo v Ljubljani, Folder 31/13,14: Act from 28 June 1854, No. 7544, Peternel's letter to the provincial government).

Mihael Peternel thus comes up as an unknown agent in the Slovene translation system. Since the middle of the 19th century, by operating on his beliefs he greatly influenced thinking in the field of translation and terminology in Slovenia. His idea of compiling terminology among the people is indeed very much idealized, but at the same time some of his suggestions about how to translate terminology without foreign or archaic additions, on the basis of the living language, are extremely progressive for his time. This was therefore a promising start for the field of terminology.

In February 1855, Peternel submitted the translated terminology to the provincial government. It was reviewed by Franc Močnik (1814–1892),[8] the leading expert and writer of mathematical textbooks in the monarchy (AS 31, Namestništvo v Ljubljani, Folder 31/13,14: Act from 17 July 1855, No. 10170). Peternel's terminology was printed by order of the Ministry in 1856 (Šlebinger 2013) and is also mentioned in the *Katalog des k. k. Schulbücher-Verlages* published by the *k. k. Schulbücherverlag* in Vienna in 1864, which speaks of the fact that it was approbated for use in schools (Katalog 1864, 44) with the title *Geometrie mit eingeschalteter Terminologie in slovenischer Sprache* (*Geometry with Terminology in*

8 Močnik wrote 148 different textbooks (mostly for mathematics), out of which 30 were published in Slovene, while his German textbooks were translated into 12 other languages (Povšič 1966): apart from Slovene, also in Croatian, Serbian, Albanian, Bulgarian, Czech, Italian, Hungarian, Greek, Romanian, Slovak, Ruthenian and Russian, and were published in 980 editions (Arko 2014, 21–26; Šuštar 2014, 41–51).


Katalog

des

K. K. Schulbücher-Verlages

in Wien.

Ausgegeben im Mai 1864.

Wien.

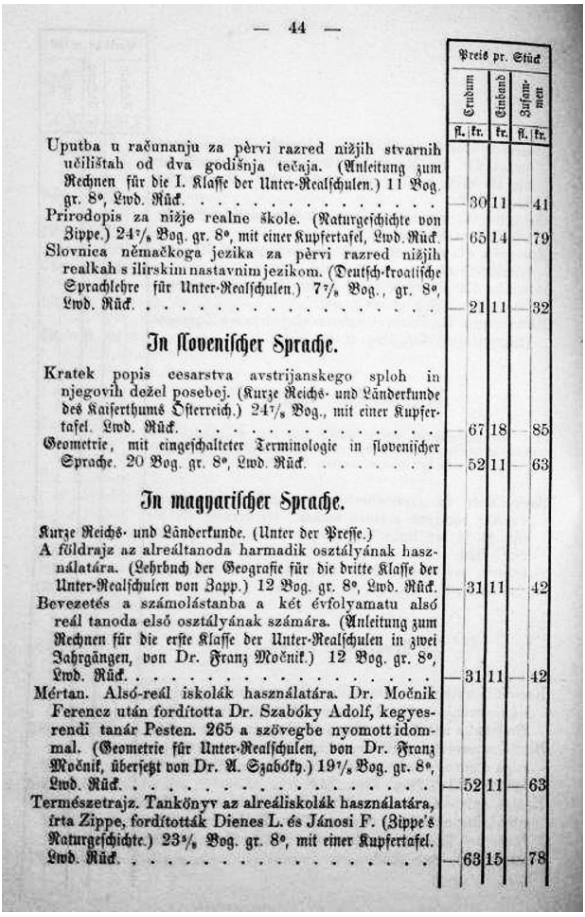
Aus der kaiserlich-königlichen Hof- und Staatsdruckerei.

1864.

Image 2: The cover of the *Catalogue of the k. k. Schulbücherverlag* (1864)

the Slovene Language Included). Apart from Cigale's translation of the textbook on the geography of the Austrian Empire, it was the only other textbook among the Slovene textbooks of the time which was approved for use in the lower *Realschule*, which demonstrates the modest production of Slovene textbooks.

The very next year, Peternel was commissioned by the authorities in Vienna to collect and edit a terminology of natural sciences. He was asked to find the Slovene terms for the expressions used in the book on botany written by Franz Xaver Zippe (1791–1863), a Czech naturalist and mineralogist who lived in Vienna. The unrealistic expectations of the Ministry of Religion and Education and their opinion on the terminological work, which was considered rather easy, can be seen in the timeframe in which Peternel was supposed to complete the job. In a letter from 20 October 1854, he was given just a two-month period to translate



— 44 —

	Preis pr. Stück		
	Exemplar	Einband	Zusammen
	fl. kr.	kr.	fl. kr.
Uputba u računanju za pèrvi razred nižjih stvarnih učilištah od dva godišnja tečaja. (Anleitung zum Rechnen für die I. Klasse der Unter-Realschulen.) 11 Bog. gr. 8°, Lwd. Rück.	— 30	11	— 41
Prirodopis za nižje realne škole. (Naturgeschichte von Zippe.) 24⅞ Bog. gr. 8°, mit einer Kupfertafel, Lwd. Rück.	— 65	14	— 79
Slovnica nèmačkoga jezika za pèrvi razred nižjih realkah s ilirskim nastavnim jezikom. (Deutsch-kroatische Sprachlehre für Unter-Realschulen.) 7⅞ Bog., gr. 8°, Lwd. Rück.	— 21	11	— 32
In slovenischer Sprache.			
Kratek popis cesarstva avstrijanskego sploh in njegovih dežel posebej. (Kurze Reichs- und Länderkunde des Kaiserthums Österreich.) 24⅞ Bog., mit einer Kupfertafel. Lwd. Rück.	— 67	18	— 85
Geometrie, mit eingeschalteter Terminologie in slovenischer Sprache. 20 Bog. gr. 8°, Lwd. Rück.	— 52	11	— 63
In magyarischer Sprache.			
Kurze Reichs- und Länderkunde. (Unter der Presse.)			
A földrajz az alreáltanoda harmadik osztályának használatára. (Lehrbuch der Geografie für die dritte Klasse der Unter-Realschulen von Zapp.) 12 Bog. gr. 8°, Lwd. Rück.	— 31	11	— 42
Bevezetés a számolástanba a két évfolyamatu alsó reál tanoda első osztályának számára. (Anleitung zum Rechnen für die erste Klasse der Unter-Realschulen in zwei Jahrgängen, von Dr. Franz Močnik.) 12 Bog. gr. 8°, Lwd. Rück.	— 31	11	— 42
Mértan. Alsó-reál iskolák használatára. Dr. Močnik Ferencz után fordította Dr. Szabóky Adolf, kegyesrendi tanár Pesten. 265 a szövegbe nyomott idommal. (Geometrie für Unter-Realschulen, von Dr. Franz Močnik, übersetzt von Dr. A. Szabóky.) 19⅞ Bog. gr. 8°, Lwd. Rück.	— 52	11	— 63
Természetrajz. Tankönyv az alreáliskolák használatára, írta Zippe, fordították Dienes L. és Jánosi F. (Zippe's Naturgeschichte.) 23⅛ Bog. gr. 8°, mit einer Kupfertafel. Lwd. Rück.	— 63	15	— 78

Image 3: Page 44 of the *Katalog des k. k. Schulbücher-Verlages in Wien* (1864), where Peternel's *Geometrie mit eingeschalteter Terminologie in slovenischer Sprache* (*Geometry with Terminology in the Slovene Language Included*) is listed

the terms in Zippe's book (AS 31, Namestništvo v Ljubljani, Folder 31/13,14: Act from 5 October 1854, No. 11704).

The letter, signed by Minister von Thun, states that Peternel should insert Slovene terms in the attached Zippe's textbook; they should be placed at each first occurrence of a specialized word. It was especially emphasized that Peternel should use the popular language that was in use ("*die populäre Ausdrucksweise*"). Evidently, Peternel did not complete the work in the given time, as in June 1856 he was allowed to wait for the release of the German-Slovene (Wolf's) dictionary, with which he apparently helped himself when he had terminological issues. On 5 June

1857, he finished his work and he handed in the Slovene translation to Zippe's botany images in Vienna. Furthermore, in the archive sources we also found a hint that a similar terminological list was being prepared for the field of physics (AS 31, Namestništvo v Ljubljani, Folder 31/13,14: Act from 18 August 1859).

It follows from the above that the initiatives for Slovenian textbooks often came from the administrative centre, namely from the Ministry of Religion and Education in Vienna, and that the centralization of education and progressive teachers made a decisive contribution to the development of the first Slovene terminology for certain fields, such as geometry, in this case. It can be concluded that, already in the 1850s, terminology was being formed for certain specialized fields of knowledge, and that terminological lists were being prepared, either as expressions in brackets in the running text or attached as glossaries to German textbooks.

3.2 Cigale's *Znanstvena terminologija* (1880)

A significant turning point, which influenced the development of the Slovene specialized and scientific terminology, was the year 1880, when the long-time associate and translator in the editorial team of the *Reichsgesetzblatt* in Vienna, Matej Cigale, published the *Znanstvena terminologija s posebnim ozirom na srednja učilišča* (*Scientific Terminology with Special Attention to Teacher Training schools*) at the *Slovenska Matica*. The volume was a godsend to writers and translators of textbooks. The mathematician Luka Lavtar (1846–1915), for instance, in the foreword to his *Geometrija* (*Geometry*), commented regarding terminology: "I mostly followed Cigale's /terminology/, but I could not manage to solve everything with it" (Lavtar 1881: V).

Cigale's manual was compiled following a Czech model from 1853 and a Croatian one with the title *Rječnik znanstvenoga nazivlja osobito za srednja učilišta* (*Dictionary of Scientific Terms Particularly for Teacher Training Schools*), which was published in 1874 in Zagreb, also with the help of the Slovene Ivan Tušek. Apart from that, Cigale published the *Znanstvena terminologija* as a supplement to Wolf's German-Slovene dictionary, which he edited in the period 1854–1859. While later generations of textbook translators used the *Znansteva terminologija* for their work, the first generation of translators and writers of monographic textbooks greatly contributed to the creation of this terminological manual. To compile it Cigale drew from original works and translations of Slovene specialists, among them Tušek and Erjavec, which will be mentioned in more detail later, but also the linguist and Slavist Fran Miklošič (1813–1891), the geographer Janez Jesenko (1838–1908), and others.

Cigale's manual contains the terminology of 25 specialized fields, and clearly shows that various expressions competed for acceptance, such as derivatives from Czech, Russian and Croatian, which some wanted to use instead of the loan translations from German, or derivatives from Latin, which competed with unestablished and unused neologisms. We need to take into account that Cigale's *Znanstvena terminologija* (*Scientific Terminology*, 1880), just like Cigale's German-Slovene dictionary (1860) and Pleteršnik's Slovene-German dictionary (1894/95), is very descriptive, that is, it describes the variety and in principle, it states all the translation versions and does not prescribe one "correct" equivalent.

The translators were therefore building the terminology gradually, upgrading the existing translations and solutions of the previous translators, and also looking for new equivalents, as can be seen in the example from the field of mathematics. From the terminological point of view, on the basis of the translations of primary school and *gymnasium* textbooks for mathematics that were published in the 1870s and 1880s, we can notice the rather rapid development of the arithmetic and geometry terminology, which can also be linked to the publication of Cigale's terminology in 1880. It is a fact that since these first translations the terminology has been updated and is mostly stabilized today. In the table below, in the left column, the original German terms are given, in the middle one we see the terminological equivalents for primary school mathematics textbooks by Ivan Tomšič, and in the right one the equivalents proposed by Josip Celestina in his translations of the *gymnasium* textbooks (Table 1):

Table 1: Tomšič's and Celestina's terminological equivalents in the translations of mathematics textbooks

	Močnik's originals[9]	Tomšič's equivalents[10]	Celestina's equivalents[11]
1	Bruch	drob, drobec	ulomek
2	Bruchstrich	drobčeva črta	ulomkova črta
3	Rechnen	številjenje	računanje
4	Cubikinhalt	telesnina	prostornina
5	Oberfläche	poveršje	površina
6	Fläche	poveršina	ploščina
7	Grundfläche	temeljna ploskev	osnovna ploskev
8	Mantel	oblina	plašč

9 From the textbooks *Viertes Rechenbuch* (1873), *Fünftes Rechenbuch* (1878), *Lehrbuch der Arithmetik* (1879b) and *Geometrische Anschauungslehre*, I. Theil (1879a) and II. Theil (1876). English glosses are given in brackets.

10 From the textbooks *Četrta računica* (Močnik 1873) and *Peta računica* (Močnik 2004 [1878]).

11 From the textbooks *Aritmetika I* (Močnik 1882), *Geometrija I* (Močnik 1891) and *Geometrija II* (Močnik 1884).

If we compare these equivalents with Cigale's terminology from 1880, we discover that Cigale cites *ulomek, drob* for *Bruch* ('fraction') and adds a perhaps better (most probably his own) solution, *lom*; he does not have an equivalent for *Bruchstich* ('fraction slash'), but suggests *znamenje ulomka* for *Bruchzeichen* ('fraction symbol'). *Rechnen* ('to calculate') is *računiti* (*številiti* and Old Church Slavonic *čilsiti*), *Cubikinhalt* ('cubic volume') does not have a translation, *Grundfläche* ('base face') is *spodnja, osnovna ploskev* in Cigale, *Fläche* ('area') is *ploskev*, while *Mantel* ('boundary surface') is translated into Slovene by Cigale with *oblina, plašč* or *obstransko površje.* Comparing these equivalents, it is clear that Cigale's terminology is more descriptive and lists several expressions that were used, but we cannot claim that either Tomšič or Celestina had "the right" terminological solutions and the other "the wrong" one. We can instead conclude that the terminological problems were far from solved at that time, and that among the specialists several versions were circulating for the same concept or specialized content.

In the manual, Cigale used a synchronic descriptive approach and took into account the contemporary language as it was actually used (Cigale 1880: VI). In this way, he resisted the archaization and Slavization of the language that was prevailing at that time. He also tried to avoid excessive purism and unnecessary classicism, since he had to consider two opposite sides: on the one hand, the simple reader without a classical education who did not understand the terms of Greek or Latin origin, and on the other, the interest of science, which required preservation and phonetic adaptation of internationally established terms in order to maintain contact with state-of-the-art science (cf. Orožen 2003).

Some of the equivalents from the *Znanstvena terminologija* eventually found their way into Pleteršnik's German-Slovene dictionary (1894/95). All in all, Cigale's approach to terminology is quite modern, although his concrete equivalents are now part of lexical history (Jemec Tomazin 2010, 112–113). As we have seen, in the second half of the 19th century, terminology was developing in a rapid and organized manner. Apart from dictionary compilers and terminologists such as Cigale, a great contribution to the development was also made by experts and Slovene textbook writers/translators.

3.3 Basic approaches to the formation of terminology

In forming Slovene specialized terminology, we notice three basic approaches that were established in the 19th century.

1. The first approach relied on the **old dialectal Slovene words, if they existed**, that is on the expressions that were used by the people, especially

by the rural people who were not under the influence of Germanic or Romance words. Such an approach was promoted by the teacher and pioneering terminologist Peternel, who was introduced in section 3.1. This approach was of course usable only in certain cases. While Peternel hoped that expressions from the field of crafts and various craftsmanship operations could be found among the common people, or that it was sensible to expect to find some botanical expressions in this way, it was of course impossible to use this method for terms in the fields of specialized legal or mathematical terminology.

2. The second approach was extremely creative, as it involved the **formation of new words**, which was used when no other options were available. Most frequently, new words were formed on **German models through loan translations, i.e. calques**, especially new-formed compounds, e.g. *slankamen* (literally 'salty stone') for the German Salzgestein ('rock salt'), *dojivke* ('literally sucklers') for the German word Säugetiere ('mammals') and so on. Sometimes such neologisms have been preserved, other times they have not. Birds that run and do not fly, for instance, were named by Fran Erjavec *brzoteki* (literally 'fast runners') in analogy with the German *Laufvögel* ('ratites'). In his *Znanstvena terminologija*, he also gave the equivalent *tekavci* ('runners'), and today they are named *tekači*.
3. The characteristic of the third approach is **copying and searching for equivalents in other Slavic languages**, which means that authors endeavoured to introduce Czech, Croatian or (old) Russian words into Slovene. Cigale's *Znanstvena terminolgija* shows that various expressions competed for acceptance, such as derivatives from Czech, Russian and Croatian, which some wanted to use instead of the loan translations from German (e.g. *ljubin* from Croatian for the German *Seebarsch*, 'sea bass').

If we look closely at all three approaches, we must first mention the naturalist Ivan Tušek (1835–1877). His approach to compiling terminology was extremely modern, and would be called crowdsourcing today. Tušek's basic idea was that for certain realia from the field of botany Slovene names might already exist, and it was just necessary to find and collect them. When established terms did not exist, Tušek resorted to the old principle "more heads are better than one", and asked other specialists to contribute their solutions, i.e. a new expression or expressions taken from other Slavic languages.

In fact, the public debate about the correctness and appropriateness of the terms that was taking place in the contemporary newspapers is characteristic of the formation of Slovene terminology. In 1862, Tušek published an article in the field of botany with the title *Najbolj potrebne stvari iz botanične terminologije* ('The most needed things in botanical terminology') in the *Slovenski glasnik* (Tušek 1862,

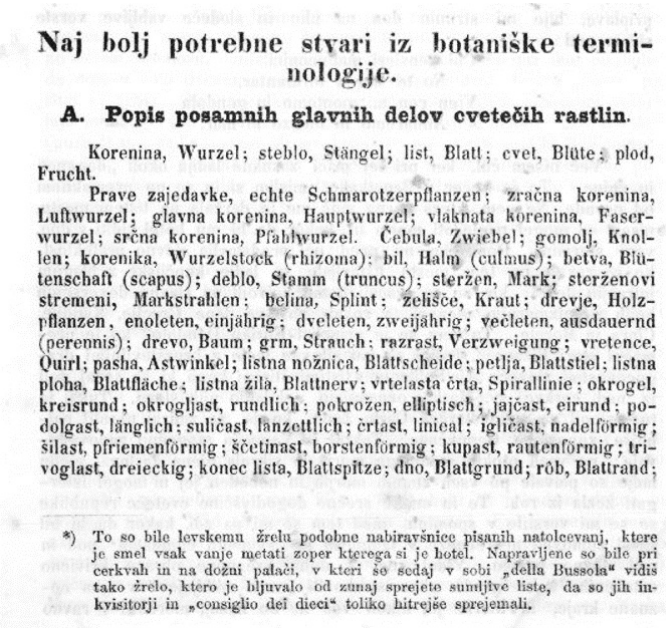
160–171), which was the basis for Tušek's later translations of botanical works, such as his translation of the textbook written by the botanist Alois Pokorny (1826–1886) with the title *Prirodopis rastlinstva* (*The Natural History of Plants*; Pokorny 1872a). In the article, he laid the foundations of Slovene botanical terminology and nomenclature, while in brackets, he added German, or sometimes even Latin names, when he believed it necessary for the sake of comprehension (e.g. *čaša, Kelch (calyx)*; *venčič, Blumenkrone (corolla)*). He concluded his long list of terms with an appeal to the (intellectual) public to contribute and help collecting terms, and above all to give their opinions and critiques on the compiled terminology. Tušek called on the (educated) public to contribute their knowledge to help solve a problem, the solution of which would benefit the entire community:

> Menim, da je najbolji in najkrajši pot, da dobimo veljavno in stalno terminologijo botaniško, ako se ta stvar pretresa po časopisih; zato pa prosim vsacega, kdor bo to od meno sostavljeno terminologijo bral, naj pošlje svoje opazke in popravke »Glasniku« ali pa neposredno meni[12] (Tušek 1862, 171).

In the article named "*O terminologiji*" ('About terminology'), which followed Tušek's botanical terminology in the same issue of the *Slovenski glasnik*, the sad state of Slovene terminology was described in even greater detail. In his contribution, the editor Anton Janežič, strongly supported Tušek in his efforts to collect botanical terminology, and added that "every Slovene that has the necessary knowledge, should actually take part in it", and offered his help as an editor. He wrote at the end that the "Slovenski Glasnik gladly opens its pages to such discussions, because only this way we can obtain good expressions" (Janežič 1862, 174).

Interestingly, this is not the only example of "crowdsourcing" in this context, and in newspapers, concrete terminological questions were often discussed. In 1871, in four consecutive numbers of Bleiweis's *Kmetijske in rokodelske novice* (47–50), Tušek also published the *Matematična terminologija* ('Mathematical terminology'), that was used by the translators of mathematics textbooks, Ivan Tomšič, Luka Lavtar and Josip Celestina. The reviewer Ivan Berbuč (1845–1924) wrote a review of *Fizika za nižje gimnazije, realke in učiteljišča* (*Physics for Lower* Gymnasium, Realschule *and Teacher Training Colleges*; 1883) for the *Ljubljanski zvon*, which was actually a literary journal but often also discussed new school textbooks, and he especially warned that it is necessary to distinguish between the terms *topitev* or *raztopitev* ('dissolving', Germ. *Auflösungsprocess*) and *talitev* ('melting', Germ. *Schmelzprocess*) (Berbuč 1883, 183). A similar pattern occurred when in the 1880s and early 1890s Močnik's textbooks on arithmetic and geometry for lower grades of the *gymnasium* were published, both in two parts and translated into Slovene by Josip Celestina (1845–1912). On the terminology

12 English translation: "I think that the best and shortest way to get a valid and permanent botanical terminology is through discussion in newspapers; therefore, I ask every person who reads this terminology compiled by me, to send comments and corrections to the "Glasnik" or directly to me."



Naj bolj potrebne stvari iz botaniške terminologije.

A. Popis posamnih glavnih delov cvetečih rastlin.

Korenina, Wurzel; steblo, Stängel; list, Blatt; cvet, Blüte; plod, Frucht.

Prave zajedavke, echte Schmarotzerpflanzen; zračna korenina, Luftwurzel; glavna korenina, Hauptwurzel; vlaknata korenina, Faserwurzel; srčna korenina, Pfahlwurzel. Čebula, Zwiebel; gomolj, Knollen; korenika, Wurzelstock (rhizoma); bil, Halm (culmus); betva, Blütenschaft (scapus); deblo, Stamm (truncus); steržen, Mark; sterženovi stremeni, Markstrahlen; belina, Splint; zelišče, Kraut; drevje, Holzpflanzen, enoleten, einjährig; dveleten, zweijährig; večleten, ausdauernd (perennis); drevo, Baum; grm, Strauch; razrast, Verzweigung; vretence, Quirl; pasha, Astwinkel; listna nožnica, Blattscheide; petlja, Blattstiel; listna ploha, Blattfläche; listna žila, Blattnerv; vrtelasta črta, Spirallinie; okrogel, kreisrund; okrogljast, rundlich; pokrožen, elliptisch; jajčast, eirund; podolgast, länglich; suličast, lanzettlich; črtast, linical; igličast, nadelförmig; šilast, pfriemenförmig; ščetinast, borstenförmig; kupast, rautenförmig; trivoglast, dreieckig; konec lista, Blattspitze; dno, Blattgrund; rôb, Blattrand;

*) To so bile levskemu žrelu podobne nabiravšnice pisanih natolcevanj, ktere je smel vsak vanje metati zoper kterega si je hotel. Napravljene so bile pri cerkvah in na dožni palači, v kteri še sedaj v sobi „della Bussola“ vidiš tako žrelo, ktero je bljuvalo od zunaj sprejete sumljive liste, da so jih inkvisitorji in „consiglio dei dieci“ toliko hitrejše sprejemali.

Image 4: The first page of Tušek's *Najbolj potrebne stvari iz botanične terminologije* ('The most needed things in botanical terminology') in the *Slovenski glasnik* in 1862, page 160

in Celestina's translation, Andrej Senekovič (1844–1926), who is known for his textbooks for physics and chemistry, wrote that Celestina's work was considerably easier because he could rely on the terminology that was already in Luka Lavtar's (1846–1915) mathematics book (Senekovič 1883, 71). In fact, Lavtar added a chapter with the title *Terminologija* ('Terminology')[13] at the end of his translations of textbooks for teacher training schools, in which all the terms used in the textbook were listed. Although as a rule in the body of the textbook he used terms of foreign origin, in the glossary Lavtar always places the Slovene term first before the German source expression. Since he was aware that one author could hardly create a terminology that would be accepted by everyone, he suggested what we already saw in Tušek and his botanical terminology, "that we should start to critically discuss the dubious expressions in some paper; this way we could get to permanent expressions in the quickest way" (Lavtar 1881: V).

The second and third approaches are characterized by the formation of new words following foreign, usually German, examples. The writer and naturalist Fran Erjavec (1834–1887) translated *Prirodopis živalstva s podobami* (*The Illustrated*

13 Undoubtedly, it is a desideratum for future research to compare Peternel's terminology from the 1850s and Lavtar's terminology from the late 1870s/1880s.

Natural History of Animals) (Pokorny 1872b), which was reprinted three times after it was first published in 1864.[14] In Erjavec's translation of *Prirodopis živalstva*, we see that the names of the animal orders, classes and species in Slovene are usually followed by the German and Latin equivalents as well. This shows the initial uncertainty in introducing new terms and thus the use of the German term preserved along with the Latin, as the former was likely to be known by the *gymnasium* students, making things easier to understand. Consequently, in the Slovene textbook each animal species is named at least in three languages, while as a rule, the original German text only has expressions in two languages.

Table 2: Names of the animal species in the textbooks *Illustrierte Naturgeschichte* and in Erjavec's translation *Prirodopis živalstva*

	***Illustrierte Naturgeschichte* (Pokorny 1870)**	***Prirodopis živalstva* (Pokorny, transl. by Erjavec 1872b)**
1	die Viper oder Kreuzotter (Vípera berus) (p. 118).	gad (die Viper oder Kreuzotter, Vípera berus) (p. 125)
2	der europäische Seebarsch (italien. Branzin, latein. Labrax lupus) (p. 127)	ljubin (der Seebarsch, laško: branzin, latinsko: Labrax lupus) (p. 134)
3	die Gazelle (Antílope Dorcas) (p. 47)	gazela (die Gazelle, Antílope Dorcas) (p. 46).
4	der Kuguar (Puma oder amerikanischer Löwe, Felis cóncolor) (p. 19)	kuguar, puma ali amerikanski lev (der amerikanische Löwe, Felis Cóncolor) (p. 19)

For marine animal species, the original and translation listed terms in Italian as well (example 2), which indicates that the author/translator took into account the frequency of use in the coastal region. In example 3, Erjavec's newly introduced word for the sea bass, i.e. *ljubin,* is interesting; this word is not present in Wolf's dictionary and it has not been preserved until today. Erjavec borrowed the term from Croatian (Cro. *lubin*, still used today), which confirms the above-mentioned fact that translators sometimes sought terminology in other Slavic languages. The examples also show that Erjavec used local names (example 1) for the animals that were present in the Slovene territory, while with foreign animals the Slovene term was usually modelled on German (examples 3 and 4). When the original offered more than one term in German, as a rule, Erjavec also included all the versions. Based on the analysed examples, the textbook could be described

14 In this analysis, we looked into two approbated editions, the Slovene one from 1872, printed by the Slovenska Matica, and the German one, published by the Prague publisher H. Mercy (Pokorny 1872b). Erjavec's translation, *Prirodopis živalstva*, was used in *gymnasiums* between 1872 and 1907, when it was replaced by the approved textbook by Ivan Macher, *Prirodopis živalstva za nižje razrede srednjih šol* (*Zoology for Lower Grades of Secondary Schools*).

as some kind of terminological glossary, as the students were able to learn the names of animal species in at least three languages.

Phyla, orders and classes, unlike the names of animal species, are scientific categories that were not present in the language of the people, therefore the translator, Erjavec, had to search for new (sometimes very creative, but presently completely archaic) solutions, as shown in Table 3 below:

Table 3: Erjavec's loan translations of the names of animal orders in the textbook titled *Prirodopis živalstva*

	***Illustrierte Naturgeschichte* (Pokorny 1870)**	***Prirodopis živalstva* (Pokorny, transl. by Erjavec 1872b)**
1	Laufvögel	brzoteki
2	Schwimmvögel	plovci
3	Laufkäfer	brzci

We see that in some examples Erjavec did not find the most appropriate solution in terms of word formation principles. From the German term *Laufkäfer* it is clear that we are dealing with "running" beetles and they belong to the order of insects, while Erjavec calls them *brzci*, which only tells us that they are fast, but not that they are beetles. The Slovene terms were therefore derived by Erjavec only on the basis of the first part of the German compound, and thus, for instance, the Slovene equivalent of the German term *Laufvögel* ('running birds'), *brzoteki*, does not tell us that these are *birds* that run fast; today they are called *nojevci* ('ostriches'), or sometimes *tekači* (runners'). Out of all the examples mentioned, only Erjavec's translation of the order *Schwimmvögel*, i.e. *plovci*, water birds with webbed toes and flat beaks, was preserved, and even in this case, the term *plojkokljuni* is preferred.

Except for the names of animal species, in Erjavec's textbook there are no German equivalents in brackets after the Slovene equivalent. German expressions are given only in the additional chapter on humans, where when they are first mentioned, as all the terms from the field of anatomy have the German equivalent beside them. Such examples are *sluznica* (*Schleimhaut;* 'mucous membrane'), *vranica* (*Milz;* 'spleen') ali *žolč* (*Galle;* 'bile'). The fact that Erjavec used the original German words in brackets clearly shows that the translator was aware of the introduction of new terms; therefore, he tried to ensure that the target reader could understand the meaning of the word, so he diligently also noted the German term. In this way, Erjavec as a translator took on the role of an innovator who introduces new expressions into the vocabulary.

3.4 Different strategies in the formation of Slovene terminology from the viewpoint of the target audience

When forming and introducing new terminology, translators followed different strategies. The differences were mostly the result of the translator's consideration for his target readers, which were not always the same. Below, some examples from Močnik's translation of mathematics textbooks are shown. We analysed the differences in translation strategies between Ivan Tomšič's (1838–1894) translation of the mathematical terminology in primary school mathematics textbooks, and those used in the translation of *gymnasium* textbooks by Josip Celestina (1845–1912).

Ivan Tomšič translated Močnik's five-volume mathematics textbooks for people's schools between 1871 and 1878. He is not listed as the translator in any of the five books, but is mentioned as the translator by Povšič (1966), among others. The remade three-volume mathematics textbooks for people's schools, which were first published in Slovene in 1894, were also translated by Ivan Tomšič. Again, he is not mentioned in these editions, so he remains "invisible" (Venuti 2002) or is at least not credited, but from the obituary written by Anton Funtek (1894, 309) and published in the *Ljubljanski zvon*, we can see that these translations were Tomšič's work.

As far as terminology is concerned, in primary school mathematics textbooks there are a number of examples when the Slovene standard expression is followed by a generally known – rather dialectical or colloquial – expression in brackets, which is usually a loanword from German. Examples such as *zeleno (frišno) spravljeno seno* ('fresh harvested hay'), *pločevina (pleh)* ('sheet metal') or *zaboj (kišta)* ('box') are found in all primary school mathematics textbooks, even in the revised editions from 1894. From today's perspective, the expressions such as *frišno* (*frisch*, i.e. 'fresh hay'), *pleh* (*Blech*, i.e. 'sheet metal') or *kišta* (*Kiste*, i.e. 'box') are archaic or dialectal/colloquial; however, we must put ourselves in the position of the observer in the original time and space. Undoubtedly, the use of calques of German expressions, which would be called Germanisms today (and are still present in some Slovene dialects), was much more frequent than the use of the "pure" Slovene expressions introduced by Tomšič. The latter words still had to be established. In order to make his audience understand, the translator used basic vocabulary, the language of communication, in which Germanisms had often been introduced, and probably felt the obligation to "clean" and Slovenize, look for expressions with less German connotation and replace them with new, not yet established words. The words given in brackets in Tomšič were a sign of uncertainty: as the translator wanted to reach the audience, he tried to ease their comprehension by using known, colloquial expressions.

Subsequently, we compared Tomšič's translation strategy in the mathematics textbook for primary schools with Josip Celestina's translation strategy in his translations of mathematics textbooks for higher schools. For the lower grades of the *gymnasium*, textbooks on arithmetic and geometry, each in two volumes, were translated by Josip Celestina. On the covers of all four textbooks, both the name of the author of the original text and the name of the translator are given. When the first part of the *Aritmetika* was published, the *Ljubljanski zvon* especially praised the appearance of the textbook: "Those who compare the German original, printed on bad paper with old fonts, with Celestina's book, must be happy with all their hearts about this beautiful textbook"[15] (Levec 1882, 507). We can see, therefore, that even the look of the textbooks was used as proof to show the equivalence of the Slovene volumes compared to the German ones.

Slovene mathematics textbooks for the *gymnasiums* pursued other goals compared to primary school ones, which wanted to train the pupils with practical exercises to act independently in farming and trading and were therefore written in a simple and comprehensible language. The *gymnasiums* educated future university students, so they introduced their students to the language of science and to the terminology that the students needed to know in both Slovene and German. In all the four analysed *gymnasium* textbooks, when a mathematical term is first mentioned, the Slovene expression is given first, followed by the German equivalent (Table 4).

Table 4: German equivalents of Slovene terms in the textbook *Geometrija II*

	***Geometrija za nižje gimnazije. II. del* (Močnik 1884, translated by Celestina)**
1	krožnica (*Kreislinie*)
2	polumer ali radij (*Halbmesser, Radius*)
3	včrtan (*eingeschrieben*)
4	računati (*rechnen*)
5	oni sta v premem razmerji (*stehen im geraden Verhältnisse*)

The German equivalents in brackets are used for nouns (examples 1 and 2), adjectives (example 3), verbs (example 4) and phrases (example 5), which again shows the specific goal of the text and at the same time the idea of the translator that it might be easier for the *gymnasium* students to learn the Slovene term if they also saw the German one.

15 The original says: "Kdor primerja nemški, na slabem papirji s starimi črkami natisnjen izvirnik s Celestinovo knjigo, mora se te lepe šolske knjige veseliti iz vsega srca".

The difference between primary and secondary school textbooks is therefore apparent in the use of terminology. A characteristic of the mathematics textbooks was thus the addition of synonyms, often in brackets, for both terms and words from the general vocabulary, which was already pointed out by Prunč (2007, 25–27) in his analyses of translations from the second half of the 19th century. This phenomenon is indicative of the instability of the standard written Slovene language during this period, since the translator additionally explained terms that were not yet widespread among users, and might not be understood, by adding a synonymic term. The explanatory addition of synonyms is especially present in primary school mathematics textbooks. These taught the pupils how to use mathematics in practice, for which they did not need to have any terminological knowledge. It was quite different at a *gymnasium*, which educated future students and prepared them for university, as is shown in Table 5.

Table 5: Comparison of the explanation of subtraction in the translations of the textbook *Tretja računica* and *Aritmetika I*

***Tretja računica* (Močnik 1871, translated by Tomšič)**	***Aritmetika I* (Močnik 1882, translated by Celestina)**
Odštevati (subtrahirati) se pravi število od števila jemati. Število, od kterega se odjemlje, imenuje se zmanjševanec; manje število, ktero se odšteva, imenuje se odštevanec, in število, ki pri odštevanji izide, imenuje se ostanek ali razloček (p. 16).	Odštevati (subtrahieren) se pravi, iz vsote dveh števil in iz jednega obeh sumandov iskati druzega. Dano vsoto imenujemo minuend ali zmanjševanec, dani sumand subtrahend ali zmanjševalec, odštevanec, iskani sumand diferenco, razliko ali ostanek. Ako prištejemo diferenco k substrahendu, dobimo minuend (p. 16–17).

While primary school textbooks talked about *zmanjševanci, odštevanci* and *razlika,* or *ostanek,* in the *gymnasium* books, foreign words started to appear, such as *minuend, subtrahend* and *diferenca* ('minuend, subtrahend, difference'). Translators translated the same German terms differently, depending on the level of schooling the book was intended for. For primary school pupils it was enough if they knew the terms derived with Slovene root words (*zmanjševanec, odštevanec, ostanek*). In the *gymnasium* textbooks, when a term is first mentioned both the term of classical origin and the Slovene term were used, but the terms of foreign origin (*minuend, subtrahend, diferenca*) were placed first.

On the basis of the analysis of individual examples, a typical feature of the translation of the textbooks in the second half of the 19th century is revealed. Since the translators of the mathematics textbooks analysed in this chapter were also teachers,

they translated for the needs of the schools in which they operated. Tomšič, as a primary school teacher, translated mathematics textbooks for people's schools, while Celestina, being a *gymnasium* teacher, translated textbooks for *gymnasiums*. Both of them knew their target readers very well, so they were able to adapt the translations to their needs. It has been shown that the people's schools textbooks translated by Ivan Tomšič, and even more so the textbooks of Luka Lavtar, are adaptations rather than translations of Močnik's original textbooks, while Josip Celestina preserved equivalence with the source texts in his *gymnasium* textbooks. This is in line with the findings of Prunč (2007, 59), who studied translations of German texts into Slovene between 1848 and 1918 and found that for texts with a high status the rules of equivalence would usually apply, while texts with lower status are goal-oriented and adapted to the needs of the end users. In primary school textbooks we can find simplifications and adaptations, while Celestina, in his translations of *gymnasium* textbooks, remained faithful to the source text even with regard to terminology.

4 CONCLUSIONS

Just as Rome was not built in a day, so Slovene specialized terminology was not developed overnight. Archival sources show that since the 1850s some kind of terminology lists started to appear – Mihael Peternel, for instance, compiled the first known geometry and botany terminology. Slovene terms were given in brackets within the main body of the text or attached in the form of glossaries in German textbooks, which can be considered as an intermediate step towards the first fully Slovene monographic textbooks that appeared from the 1860s onwards. The importance of the terminological work of translators is also testified by the fact that a considerable share of the entries in the first Slovene terminological manual (Cigale 1880) were gathered from the translations of the abovementioned textbooks.

The road to the gradual birth of Slovene specialized language was indeed long. At first, there was complete chaos in this field. Linguists and translators of textbooks invented new Slovene expressions, some of which were based on German word formation processes, others were derived from Czech, South Slavic or even Old Church Slavonic expressions that the translators tried to render in Slovene. Most frequently, however, in creating new terms the authors followed German terminology and existing German textbooks and used loan translations, basing the word formation processes they used, for instance in forming compounds, on German word-formation rules. Regardless of the aspiration for linguistic and national emancipation and in spite of the resistance towards German cultural dominance, German remained an important, if not fundamental reference point.

Hence, it is not possible to talk about the development of Slovene specialized terminology – undoubtedly an important foundation for the formation of Slovene as a mature "national" language – without considering the influence of German on its development.

Our aim in this study was to show that translation played a pivotal role in the development of Slovene mathematical and biological terminology: our findings reveal that this was indeed the case. In the present research, the translators of textbooks from German to Slovene are shown as innovators on the stage of the Slovene cultural history, who coined new words, several of which have been preserved until the present day and – judging from the present-day point of view – have found their way into standard written Slovene and its specialized language. For Slovene, the credit for this achievement goes to the numerous intellectuals who were active in several fields, in a true universal spirit. In fact, in the 19th century it was fairly typical that the average teacher, writer, intellectual, cultural worker, official, priest or politician worked as a translator, among other things. In the field of terminology in particular, we found that all the individuals that were responsible for the development of Slovene specialized terminology and for the creation of the first specialized translations worked in the field of education. They sought and found numerous creative equivalents and were very aware of the target audience, adapting their translation strategies to their target readers.

Nevertheless, it is precisely at the level of the agents that the typical reception of translators and translation work in Slovenia becomes apparent, too, since the individuals mentioned above are little known today. A much greater significance and role is attributed to authorial work, rather than to translation. Attention is frequently drawn to the contributions of writers and poets to the Slovene culture and language, but much less is given to translation activity. As far as the first specialized translations are concerned, the need for specialists in various fields was even more pressing, because – as the teacher Peternel already found out in the 1850s – specialists from the fields of the humanities knew too little about natural sciences, mathematics, law and technology, therefore they seldom ventured into those areas or even overlooked them. We like speaking about the contribution of the canonized writers and poets, but unfortunately few are aware of the good work and importance of Mihael Peternel, Fran Erjavec, Ivan Tušek, Ivan Tomšič, Josip Celestina, Matej Cigale and other specialized translators/teachers for the development of Slovene specialized terminology.

Acknowledgement

The authors acknowledge the financial support from the Slovenian Research Agency (research core funding No. P6-0265).

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